Math 180 Discussion Problems

Tuesday, October 7, 2014

1. *Have you reviewed trigonometry? No notes this time – you have to know this off the top of your head!*

    (a) Is the following argument correct? Why or why not?

    $$\cos\left(\frac{11\pi}{12}\right) = \cos\left(\frac{2\pi}{3}\right) + \cos\left(\frac{\pi}{4}\right) = \frac{-1}{2} + \frac{1}{\sqrt{2}} = \frac{\sqrt{2}-1}{2}$$

    If it is wrong, fix it.

    (b) How about this one?

    $$\sin\left(\frac{-\pi}{3}\right) = -\sin\left(\frac{\pi}{3}\right) = \frac{-\sqrt{3}}{2}$$

    Again, if it's wrong, fix it.

2. What is $\log_{10}(0.01)$? How about $\log_7(1)$? And $\log_2(16)$?

3. Consider the function $L(t) = 1 - \ln(1 - x^2)$.

    (a) What is the domain of $L(t)$?

    (b) What is $L'(t)$?

    (c) Using the information from the previous parts, sketch a graph of $L(t)$.

4. Considering the function $f(x) = x^3 - 1$, what is $f^{-1}(x)$?

5. Find the derivative of $g(x) = 2^{x-1}$.

6. If $x = \tan y$, what is $\dfrac{dy}{dx}$ in terms of x?

7. Find all points at which the curve $x^2 - y^2 = x^4$ has horizontal or vertical tangent lines.

8. Evaluate the limit, justifying your answer completely.

    $$\lim_{x\to\infty} \frac{\sin(x) - \sqrt{4x^2 - 1}}{x - \cos^2(x)}$$

9. Consider the function $s(x) = 7$. Derive $s'(x)$ from the definition.